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[54] **MODULAR OPTICAL CROSS-CONNECT ARCHITECTURE WITH OPTICAL WAVELENGTH SWITCHING**

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[58] **Field of Search** 385/24, 46; 359/124–125, 359/127–128, 117, 120–121, 163

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[57] **ABSTRACT**

An optical cross-connect node architecture interfaces plural optical fiber input and output links, each link containing plural wavelength channels. In one embodiment, the input links are connected to an optical coupler. Pairs of tunable optical filters and optical wavelength converters are each connected to an output port of the optical coupler and perform wavelength channel routing and switching in the wavelength domain, i.e., without the need for any optical space switch. In another embodiment, an additional input wavelength converter is connected to each input fiber link to convert the plural wavelength channels on each link to different, noninterferring wavelengths. This prevents wavelength contention in the optical coupler to which the input wavelength converters are connected. New fiber links may be added in modular fashion without significant impact on the pre-existing optical cross-connect structure. Similarly, new wavelength channels may also be multiplexed onto existing fibers to provide wavelength modularity without having to reconfigure the node.

27 Claims, 6 Drawing Sheets